

Teacher's Guide for ODYSSEY

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"Mind-Blowing Mirror Molecules," pages 6–9

1. Why do you think Figure 1 refers to the model as "ball-and-stick"?
2. Why are your hands non-superimposable?
3. What is a teratogen and who in particular would want to avoid it?
4. What kind of amino acids do living organisms on Earth use in their proteins?

"An Interview with Max Tegmark," pages 10–13

1. How is the text of this article, an interview, structured, and how does it help you understand the information?
2. According to the text in the second paragraph, why won't you meet your copies?
3. Why do you think the writer asks in the third paragraph if your brain is on overload?
4. According to the "Guide to the Multiverse," which universes follow a different set of laws of physics than our own?

"Does Our Sun Have a Death-Dealing Twin?" pages 14–17

1. Look at the chart on page 16. Make a statement about the information that it shows.
2. What is a red dwarf? What is a brown dwarf?
3. What will the Large Synoptic Survey Telescope do in 2018? Why is its job important?

"Mirror World," pages 18–21

1. What is the point of view of this piece of writing and how do you know? Why do you think it is a good choice?
2. How is the text structured (problem-solution, cause-effect, descriptive) and why do you think so?
3. In the last line on page 19, what simile helps you visualize the soil? Why is visualization important in a piece of writing?

"It's an Odyssey!" pages 22–27

- This text describes steps in a process. Describe the steps in a process for making a sandwich, folding a paper airplane, or something else you choose. Then give the instructions to a friend and see how well he or she does—and how well you did.

"Crystal Twins," pages 28–31

1. What is twin law?
2. What is Japan Law?
3. What is Carlsbad Law?
4. Why do you think twinned shape memory alloys are important?

"Ready, Set, Clone!" pages 32–35

Mark the following statements true (T) or false (F). If false, provide the necessary correction.

1. ___ Increasing the amount of DNA found at a crime scene can help to solve the crime.
2. ___ Human DNA is made up of 3 million base pairs.
3. ___ The nucleotides adenine and cytosine always pair together.

4. ___ Cloning helps make vaccines and may help in treating genetic diseases.
5. ___ Cloning affects products we use every day, such as laundry detergent.

“Build Your Brain!” pages 42–43

- What activities do you like to do? Write about what you would like to do when you grow up and why.

ANSWER KEY:

“Mind-Blowing Mirror Molecules”

1. Possible response: The molecule models resemble “balls” connected by “sticks.”
2. Possible responses: They are mirror images. There is no way to reposition your left hand to look like your right hand.
3. A teratogen is a substance harmful to unborn fetuses. Pregnant women, in particular, should avoid.
4. Living organisms on Earth use left-handed amino acids.

“An Interview with Max Tegmark”

1. Question-Answer format. Possible response: Q-A format helps me find specific information about parallel universes. It helps me get to know the interviewee, Max Tegmark, and find out what he is like and in what he believes as he answers specific questions.
2. Copies of you are either too far away or in a different dimension of reality.
3. Possible responses: It’s hard to understand what a “different dimension of reality” is because I can’t conceptualize it. It’s hard to image that there are copies of me somewhere else. It’s hard to believe something is real if I can’t see it or feel it.
4. Level II and Level IV

“Does Our Sun Have a Death-Dealing Twin?”

1. Possible responses: Over the past 250 million years, ten different disappearances of species have occurred. The high peaks mark massive extinctions.
2. A red dwarf is a small, relatively cool star. A brown dwarf is too small to be a true star, and it is cooler than other stars. Brown dwarfs are dimmer than red dwarfs.
3. It will image the entire visible sky every few nights. Possible responses: It will help scientists learn more about the universe. It could help scientists confirm whether our Sun has a twin star.

“Mirror World”

1. This story is told from the first-person point of view. Possible responses: It uses “I,” “me,” and “my.” The narrator is telling the story through his eyes. Possible response: It’s a good choice because I feel like I am right there on the adventure speaking to odd creatures and eating funny-tasting food.
2. Possible response: The piece of writing has a descriptive text structure. The narrator describes his adventure through an unfamiliar place. His descriptions help the reader “see” where he is and what he is doing. For example, he describes how he is “plunged against [his] will” into the mirror world, or how his stomach turns when he drinks the “fresh” milk.
3. Simile: black, like soot. Possible response: Visualization is important because it helps readers understand the text; it helps paint a picture in their minds.

“It’s an Odyssey!”

Students should be able to follow the descriptions independently and final products should be appropriately assembled or useable.

“Crystal Twins”

1. Twin law is how two crystals relate to each other and is dependent on the geometry of the structure of the crystal.
2. Two crystals joined at almost right angles.
3. Crystal twins rotated 180 degrees from each other.

4. Possible responses: Twinned shape memory alloys straightened my teeth! Twinned crystals can continue to positively affect people's lives. Twinned crystals have more in store for the future of science and medicine.

"Ready, Set, Clone!"

1. (T)
2. (F) Human DNA is made up of 3 billion base pairs.
3. (F) The nucleotides adenine and thymine always pair together.
4. (T)
5. (T)

"Build Your Brain!"

Responses will vary but should include a list of activities and a description with supporting details.